



May 29, 2014

Mr. Dwight Leisle
Port of Portland
7200 NE Airport Way
Portland, Oregon 97218

Re: Surface Soil Sampling – Remedial Design
Willamette Cove Upland Facility
Portland, Oregon
ECSI No. 2066
1056-03

Dear Mr. Leisle:

This letter presents the results of surface soil sampling activities completed to support the preparation of the Remedial Design for the Willamette Cove Upland Facility (the Facility; Figures 1 and 2) in the St. Johns area of Portland, Oregon. Work at the Facility is being conducted under Voluntary Agreement EC-NWR-00-26 between the Port of Portland (Port), Metro, and the Oregon Department of Environmental Quality (DEQ). The sampling activities were completed in accordance with the DEQ-approved scope presented in *Proposed Surface Soil Sampling – Remedial Design* letter (Apex, 2014). The methods, procedures, and results of the chemical analyses are presented in this letter.

SAMPLING ACTIVITIES

Preparatory Activities

The following activities and schedule coordination were completed in preparation for the field work.

- **Health and Safety Plan (HASP).** Apex Companies, LLC (Apex) updated the HASP for its personnel involved with the project.
- **Coordination of Facility Access.** The work activities were conducted in coordination with Metro.

Surface Soil Sampling

Six areas were identified for a removal action (Figure 3). Surface soil samples were collected at Areas 1 through 6 to better define the removal action areas (Figures 4 through 9). Soil samples were collected using the following protocols.

- The sample locations were established using a high-accuracy, handheld global positioning system (GPS) device (Trimble® GeoXH™).
- The samples were collected from the top 6 inches of surface soil (after removing vegetation) with a 0.5-inch-diameter cylindrical stainless steel sampler. Multiple aliquots were collected at each location (within a 5-foot diameter) in order to collect sufficient volume for analysis.
- The soil collected at each sample location was thoroughly homogenized in a stainless steel bowl. Following homogenization, one 8-ounce jar was collected.
- Non-disposable items (e.g., sampler, spoons, bowls, etc.) were cleaned by washing in a detergent (Alconox®) solution, rinsing with tap water, followed with a deionized water rinse prior to initiating sampling and between sampling locations.

Area 5 is in a location of a historical removal action (Figure 6). Follow-up review of the removal action activities determined that the excavation was not backfilled with imported clean fill. The sidewalls of the excavation were sloped following the excavation activities. Consequently, Area 5 was sampled consistent with the other locations (as described above).

CHEMICAL ANALYSES

The soil samples were submitted to Apex Labs in Tigard, Oregon for chemical analyses on a normal turnaround basis for the following:

Area	Primary Analytical Method	TCLP (number)
1	Mercury by EPA Method 7471	--
2	PAHs by EPA Method 8270M-SIM	RCRA 8 (1)
3	Lead/Mercury by EPA 6010/7471	RCRA 8 (3)
4	Copper by EPA 6010	--
5	Mercury by EPA Method 7471	RCRA 8 (1)
6	Copper/Zinc/Mercury by EPA 6010/7471	RCRA 8 (1)

These analyses correspond with the Contaminants of Concern (COCs) that exceeded the hot spot level in the Feasibility Study (FS). The requested method reporting limits (MRLs) were consistent with the historical laboratory analyses and the concentrations were presented to the method detection limit (MDL).

As noted in the table above, up to three samples (selected based on discrete sample concentrations) were analyzed for characteristic hazardous waste determination using the Toxicity Characteristic Leaching Procedure (TCLP) extract (EPA Method 1311) followed by analysis for metals with characteristic hazardous waste regulatory levels (RCRA 8 metals [arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver]) using EPA 6000/7000 series methods.

The laboratory analytical results are presented in Tables 1 through 3 and shown on Figures 4 through 9. The laboratory analytical reports (in CD-Rom format due to the length of the Level III deliverable reports) are provided in Attachment A along with a data quality review.

REPORTING

The results of the sampling presented in this letter will be incorporated in the Remedial Design and used for waste profiling at the time of the work.

If you have any questions regarding these activities, please contact the undersigned at (503) 924-4704.

Sincerely,



expires 12/31/2014

Michael J. Pickering, R.G.
Senior Associate Hydrogeologist

REFERENCE

Apex, 2014. Proposed Surface Soil Sampling – Remedial Design, Willamette Cove Upland Facility, Portland, Oregon. March 3, 2014.

ATTACHMENTS

Table 1 - Soil Sample Results – Metals
Table 2 - Soil Sample Results – PAHs
Table 3 - Soil Sample Results – TCLP Metals

Figure 1 – Facility Location Map
Figure 2 – Upland Facility Plan
Figure 3 – Facility Vicinity Plan
Figure 4 – Sampling Plan – Area 1
Figure 5 – Sampling Plan – Area 2
Figure 6 – Sampling Plan – Area 3
Figure 7 – Sampling Plan – Area 4
Figure 8 – Sampling Plan – Area 5
Figure 9 – Sampling Plan – Area 6

Attachment A – Laboratory Analytical Reports and Data Quality Review (CD-ROM)

Table 1 - Soil Sample Results - Metals
Willamette Cove Upland Facility
Portland, Oregon

Sample ID	Date:	Mercury (mg/kg)	Lead (mg/kg)	Copper (mg/kg)	Zinc (mg/kg)
Area-1-1	4/9/2014	0.271	--	--	--
Area-1-2	4/9/2014	<0.143	--	--	--
Area-1-3	4/9/2014	<0.0852	--	--	--
Area-1-4	4/9/2014	<0.114	--	--	--
Area-1-5	4/9/2014	<0.181	--	--	--
Area-1-6	4/9/2014	<0.208	--	--	--
Area-1-7	4/9/2014	<0.106	--	--	--
Area-1-8	4/9/2014	<0.124	--	--	--
Area-1-9	4/9/2014	<0.0609	--	--	--
Area-3-1	4/10/2014	0.239	37.7	--	--
Area-3-2	4/10/2014	0.826	87.1	--	--
Area-3-3	4/10/2014	6.25	433	--	--
Area-3-4	4/10/2014	1.4	92.1	--	--
Area-3-5	4/10/2014	0.158 J	58.9	--	--
Area-3-6	4/10/2014	0.223	49.4	--	--
Area-3-7	4/10/2014	1.81	464	--	--
Area-3-8	4/10/2014	1.04	260	--	--
Area-3-9	4/10/2014	1.75	172	--	--
Area-3-10	4/10/2014	3.9	322	--	--
Area-3-11	4/10/2014	74.2	787	--	--
Area-3-12	4/10/2014	0.955	48.6	--	--
Area-3-13	4/10/2014	0.316	141	--	--
Area-3-14	4/10/2014	0.320	257	--	--
Area-3-15	4/10/2014	26.6	719	--	--
Area-3-16	4/10/2014	2.31	287	--	--
Area-3-17	4/10/2014	1.95	346	--	--
Area-3-18	4/10/2014	1.83	424	--	--
Area-3-19	4/10/2014	0.703	198	--	--
Area-3-20	4/10/2014	0.437	831	--	--
Area-4-1	4/10/2014	--	--	46.7	--
Area-4-2	4/10/2014	--	--	40.9	--
Area-4-3	4/10/2014	--	--	44.8	--
Area-4-4	4/10/2014	--	--	45.4	--
Area-4-5	4/10/2014	--	--	40.5	--
Area-4-6	4/10/2014	--	--	34.5	--
Area-4-7	4/10/2014	--	--	50.0	--

Sample ID	Date:	Mercury (mg/kg)	Lead (mg/kg)	Copper (mg/kg)	Zinc (mg/kg)
Area-5-1	4/14/2014	3.16	--	--	--
Area-5-2	4/14/2014	1.92	--	--	--
Area-5-3	4/14/2014	4.54	--	--	--
Area-5-4	4/14/2014	0.709	--	--	--
Area-5-5	4/14/2014	3.39	--	--	--
Area-5-6	4/14/2014	2.50	--	--	--
Area-5-7	4/14/2014	2.22	--	--	--
Area-5-8	4/14/2014	1.84	--	--	--
Area-5-9	4/14/2014	0.418	--	--	--
Area-6-1	4/14/2014	4.62	--	758	475
Area-6-2	4/14/2014	2.16	--	360	304
Area-6-3	4/14/2014	0.269	--	42.0	92.9
Area-6-4	4/14/2014	2.71	--	234	319
Area-6-5	4/14/2014	4.74	--	408	393
Area-6-6	4/14/2014	14.1	--	819	426
Area-6-7	4/14/2014	2.43	--	157	364
Area-6-8	4/14/2014	11.3	--	728	681
Area-6-9	4/14/2014	9.51	--	725	422
Area-6-10	4/14/2014	4.30	--	434	338
Area-6-11	4/14/2014	2.94	--	378	310
Area-6-12	4/14/2014	5.15	--	451	514
Area-6-13	4/14/2014	7.47	--	795	546
Area-6-14	4/14/2014	1.02	--	197	186
Area-6-15	4/14/2014	1.61	--	179	442
Area-6-16	4/14/2014	1.44	--	163	469

Notes:

1. Metals by EPA 6020.
2. mg/kg (ppm) = milligrams per kilogram (parts per million)
3. < = Not detected above the method detection limit (MDL)

Table 2 - Soil Sample Results - PAHs
Willamette Cove Upland Facility
Portland, Oregon

Sample ID	Date:	1-Methylnaphthalene	2-Methylnaphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene
Area-2-1	4/10/2014	0.276 J2	0.389 J2	0.0602 J	1.17 J2	1.16 J2	1.98 J2	3.33 J2	4.69	4.14	2.86	0.38 J2	0.0567 J	4.63 J2	0.405 J2	3.2	1.2 J2	4.47 J2	6 J2
Area-2-2	4/10/2014	2.21 J2	4.92 J2	<0.318	4.15 J2	3.22 J2	11 J2	17.5 J2	22.6	20.8	16.2	2.31 J2	<0.318	14.7 J2	1.15 J2	15.4	7.67 J2	13.4 J2	25 J2
Area-2-3	4/10/2014	0.342 J2	0.845 J2	<0.119	0.682 J2	0.506 J2	1.33 J2	2.32 J2	3.11	2.64	2.15	0.351 J2	<0.119	1.28 J2	<0.119	2	1.57 J2	0.826 J2	2.38 J2
Area-2-4	4/10/2014	0.124 J2	0.324 J2	<0.0585	0.388 J2	0.271 J2	0.975 J2	1.9 J2	2.7	2.41	1.43	0.268 J2	<0.0585	1.48 J2	0.0664 J	1.89	0.702 J2	0.911 J2	2.15 J2
Area-2-5	4/10/2014	<0.0352	0.0588 J	<0.0352	0.106 J2	0.0727 J2	0.321 J2	0.589 J2	0.879	0.811	0.456	0.0715 J2	<0.0352	0.512 J2	<0.0352	0.609	0.132 J2	0.259 J2	0.675 J2
Area-2-6	4/10/2014	0.136 J2	0.419 J2	<0.0588	0.507 J2	0.375 J2	1.34 J2	2.67 J2	3.51	3.5	2.02	0.378 J2	<0.0588	1.87 J2	0.0722 J	2.61	0.906 J2	0.952 J2	2.87 J2
Area-2-7	4/10/2014	0.191 J	0.589 J2	<0.117	0.417 J2	0.306 J2	0.873 J2	1.53 J2	2.19	1.68	1.39	0.219 J J2	<0.117	0.836 J2	<0.117	1.31	1.13 J2	0.65 J2	1.58 J2
Area-2-8	4/10/2014	<0.125	0.156 J	<0.125	0.178 J	<0.125	0.342 J2	0.586 J2	0.77	0.74	0.56	<0.125	<0.125	0.421 J2	<0.125	0.578	0.354 J2	0.237 J	0.656 J2
Area-2-9	4/10/2014	2.36 J2	6.23 J2	<0.33	3.97 J2	2.59 J2	9.02 J2	13 J2	16.6	13	13.4	1.94 J2	<0.33	10 J2	0.769 J2	9.71	11 J2	5.94 J2	18.8 J2
Area-2-10	4/10/2014	2.1 J2	2.64 J2	0.791	3.79 J2	6.45 J2	10.4 J2	12 J2	18.2	12.9	14.4	1.44 J2	0.297 J	27.6 J2	2.16 J2	10.4	3.96 J2	30 J2	35 J2
Area-2-11	4/10/2014	1.62 J2	3.89 J2	<0.266	2.59 J2	1.89 J2	5.27 J2	8.75 J2	10.4	9.43	8.05	1.36 J2	<0.266	5.47 J2	0.504 J	6.96	6.81 J2	4.15 J2	10.5 J2
Area-2-12	4/10/2014	0.0438 J	0.119 J2	<0.0285	0.0812 J2	0.0789 J2	0.236 J2	0.333 J2	0.533	0.351	0.33	0.0461 J	<0.0285	0.317 J2	<0.0285	0.284	0.218 J2	0.19 J2	0.432 J2
Area-2-13	4/10/2014	<0.103	0.26 J2	<0.103	0.187 J	0.131 J	0.501 J2	0.693 J2	1.18	0.769	0.756	<0.103 J2	<0.103	0.52 J2	<0.103	0.613	0.484 J2	0.327 J2	0.872 J2

Notes:

1. Polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270-SIM
2. mg/kg (ppm) = milligrams per kilogram (parts per million)
3. < = Not detected above the method reporting limit (MRL)
4. J = Estimated concentration.
5. J2 = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample. The precision goal of 30% was exceeded for this analyte by the results of the lab duplicate.

Table 3 - Soil Sample Results - TCLP Metals
Willamette Cove Upland Facility
Portland, Oregon

Sample ID	Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Lead (mg/L)	Mercury (mg/L)	Selenium (mg/L)	Silver (mg/L)
Area-3-7	<0.100	0.672	<0.05	<0.1	0.333	<0.004	<0.1	<0.05
Area-3-20	<0.100	0.759	<0.05	<0.1	0.193	<0.004	<0.1	<0.05
Composite (Areas: 2-2, 2-9, 2-10)	<0.100	0.974	<0.05	<0.1	<0.05	<0.004	<0.1	<0.05
Composite (Areas: 3-3, 3-10, 3-11)	<0.100	0.883	<0.05	<0.1	0.290	0.0078	<0.1	<0.05
Composite of (Area 5-1, 5-3 and 5-5)	<0.100	0.415 J	<0.05	<0.1	0.242	<0.004	<0.1	<0.05
Composite of: (Area 6-1, 6-6, 6-8, 6-9, 6-13)	<0.100	0.631	<0.05	<0.1	0.244	<0.004	<0.1	<0.05
Regulatory Level	5.0	100.0	1.0	5.0	5.0	0.2	1.0	5.0

Notes:

1. Metals by EPA 6020.
2. mg/kg (ppm) = milligrams per kilogram (parts per million)
3. < = Not detected above the method reporting limit (MRL)
4. TCLP = Toxicity Characteristic Leaching Procedure (TCLP) extraction by EPA Method 1311.



Note: Base map prepared from USGS 7.5-minute quadrangles of Linnton and Portland, OR, dated 2011 as provided by USGS.gov.

0 2,000 4,000
Approximate Scale in Feet



Facility Location Map

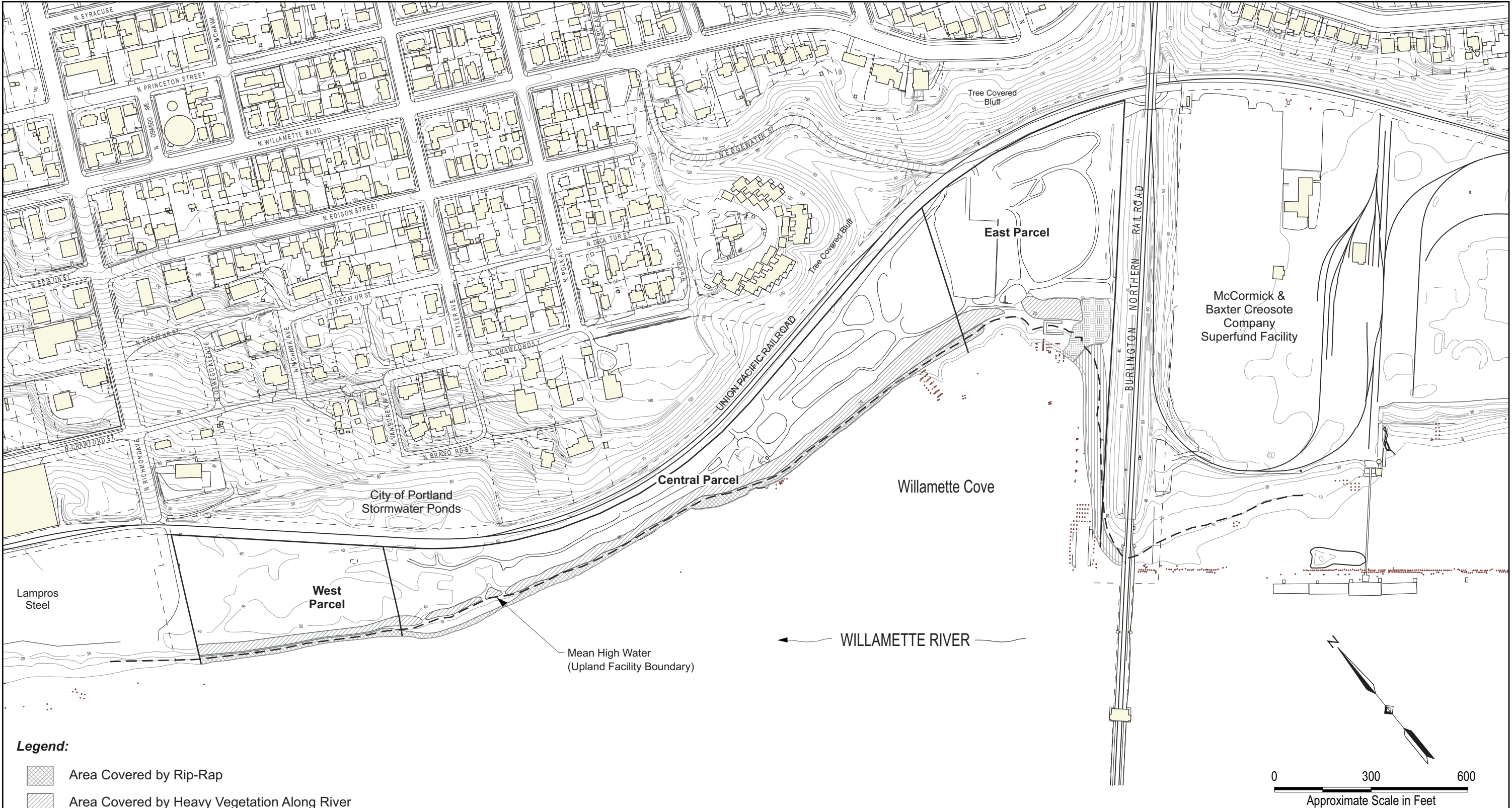
Soil Sampling - Removal Design
Willamette Cove Upland Facility
Portland, Oregon

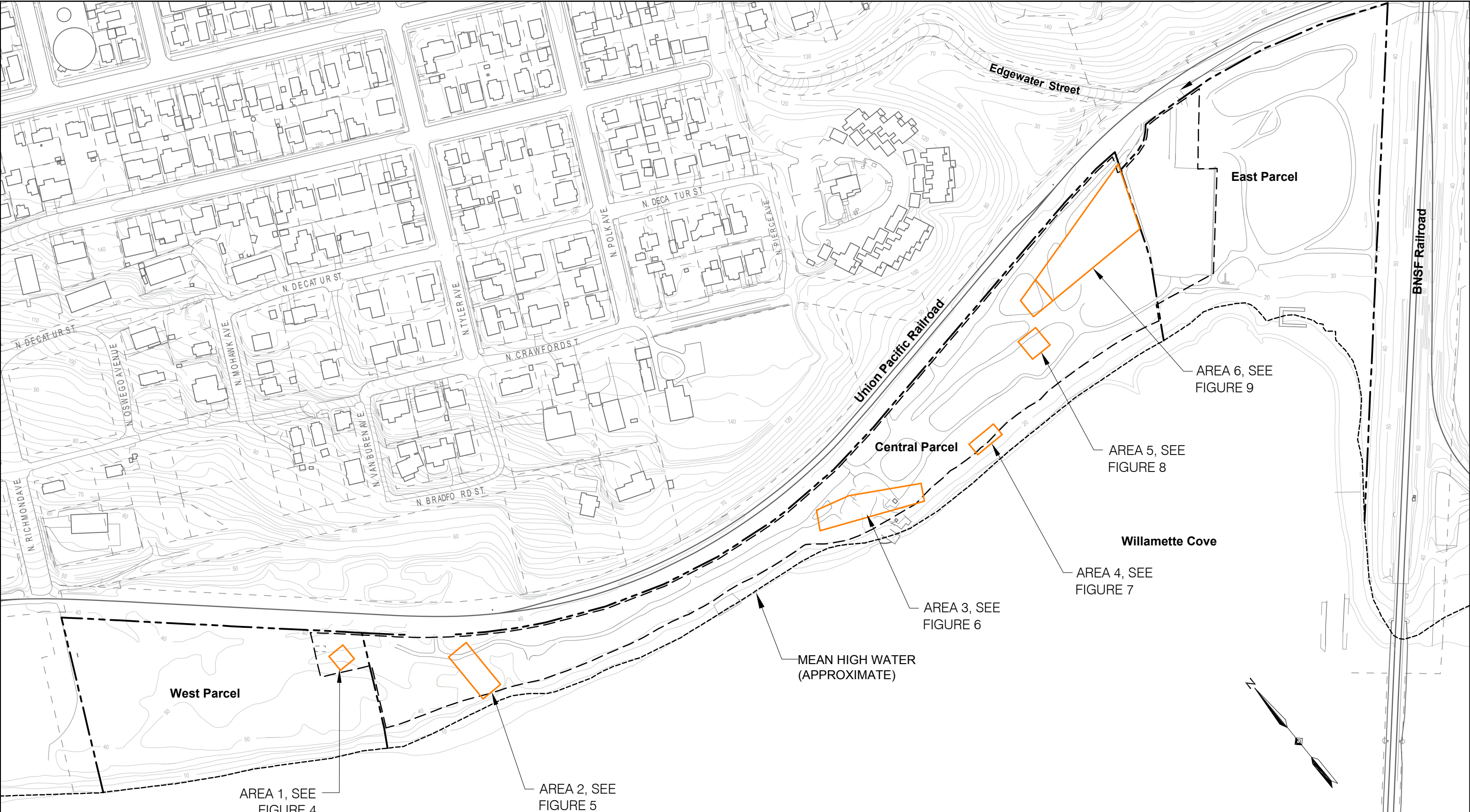


Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

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Figure
1





Facility Vicinity Plan

Soil Sampling - Removal Design
Willamette Cove Upland Facility
Portland, Oregon



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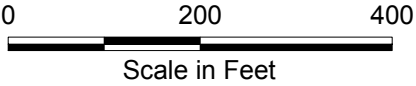
Project Number

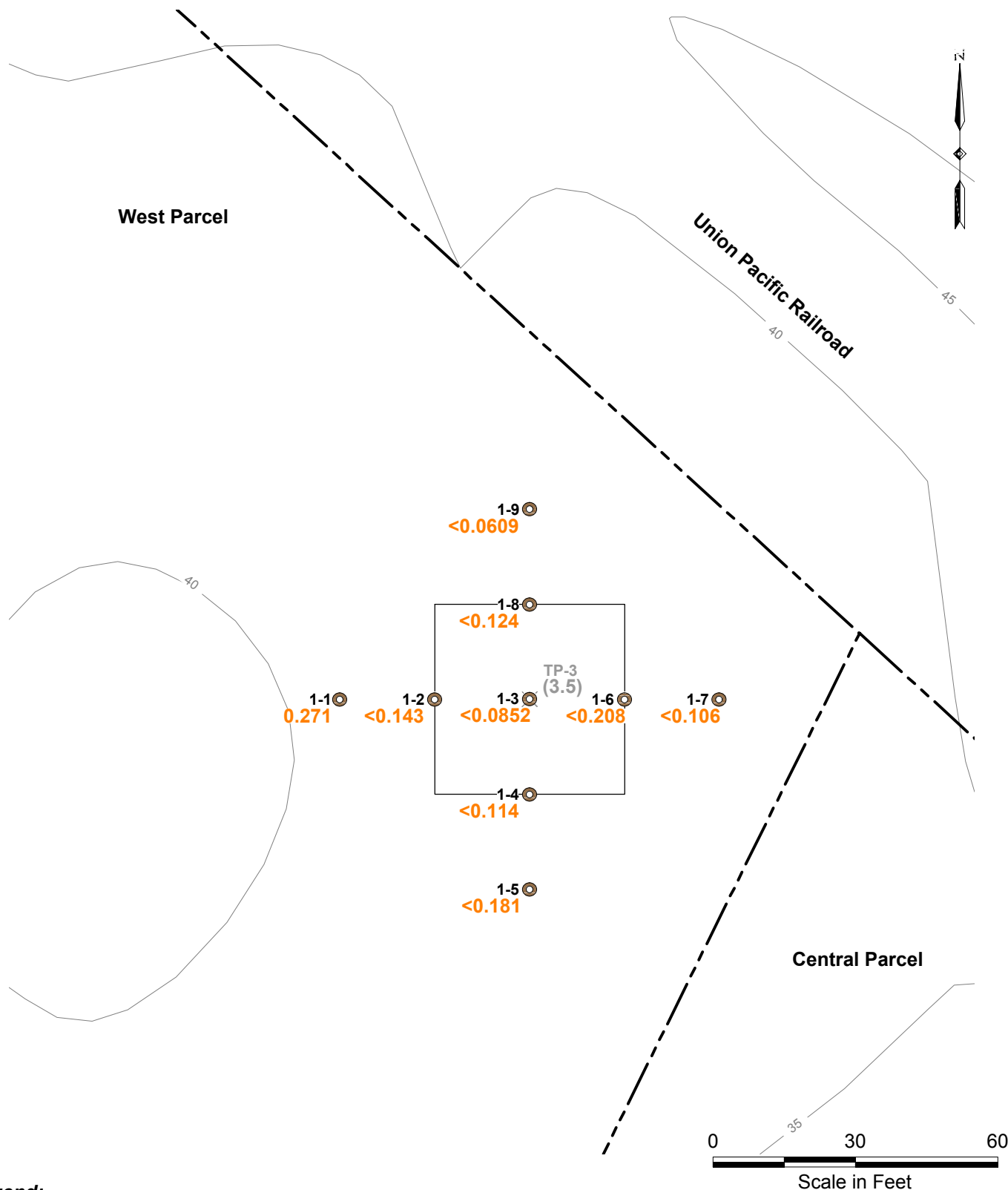
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Figure

3





Legend:

- 1-1 ● Surface Soil Sample Location
0.271 Mercury Concentration in mg/kg
- TP-3 × Historical Soil Sample Location
(3.5) Historical Mercury Concentration in mg/kg

Sampling Plan - Area 1

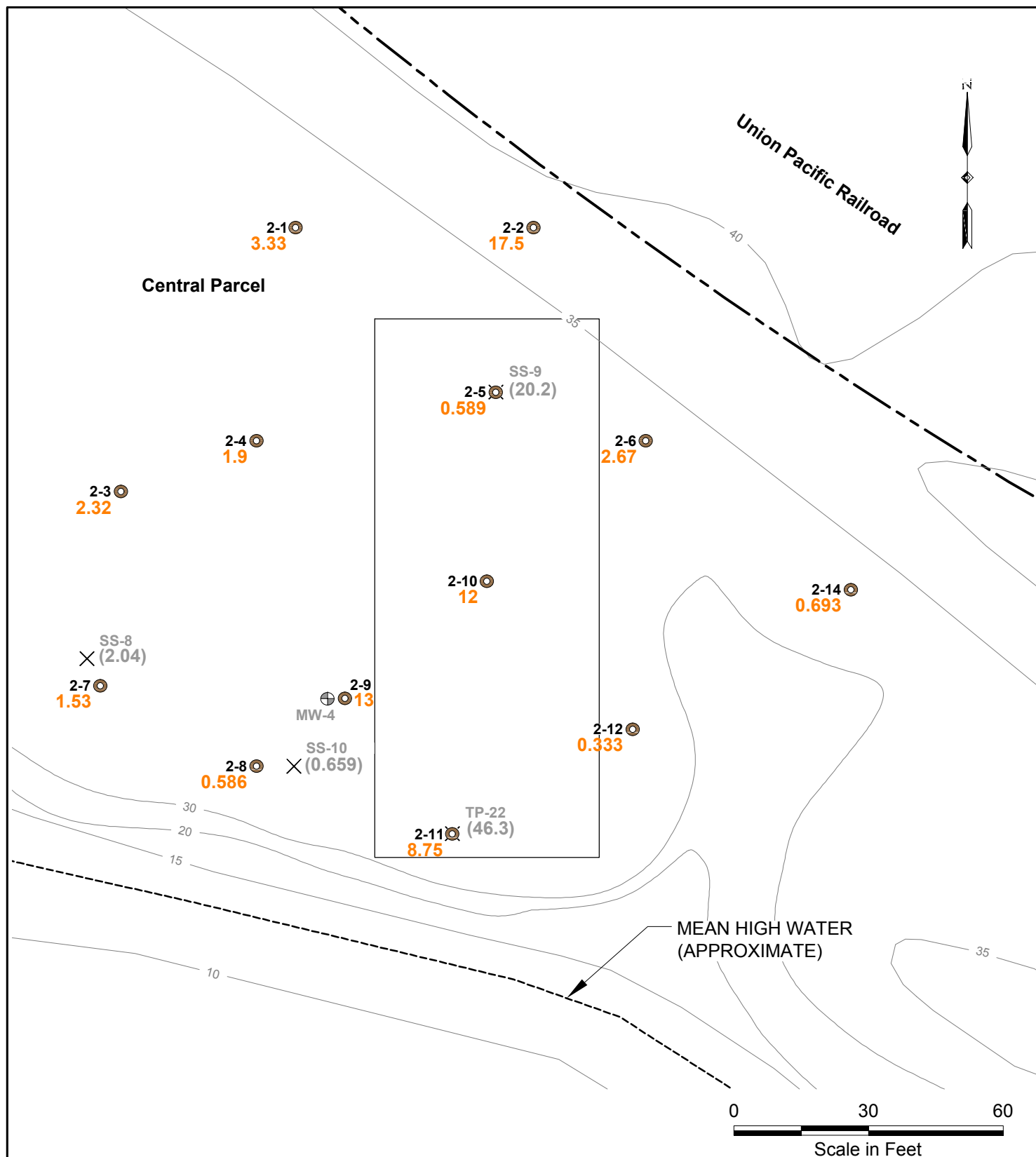
Soil Sampling - Removal Design
 Willamette Cove Upland Facility
 Portland, Oregon



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Figure
4



Legend:

- 2-1 ● Surface Soil Sample Location
- 3.33 Benzo(a)Pyrene Concentration in mg/kg
- SS-10 × Historical Soil Sample Location
- (0.659) Historical Benzo(a)Pyrene Concentration in mg/kg

Sampling Plan - Area 2

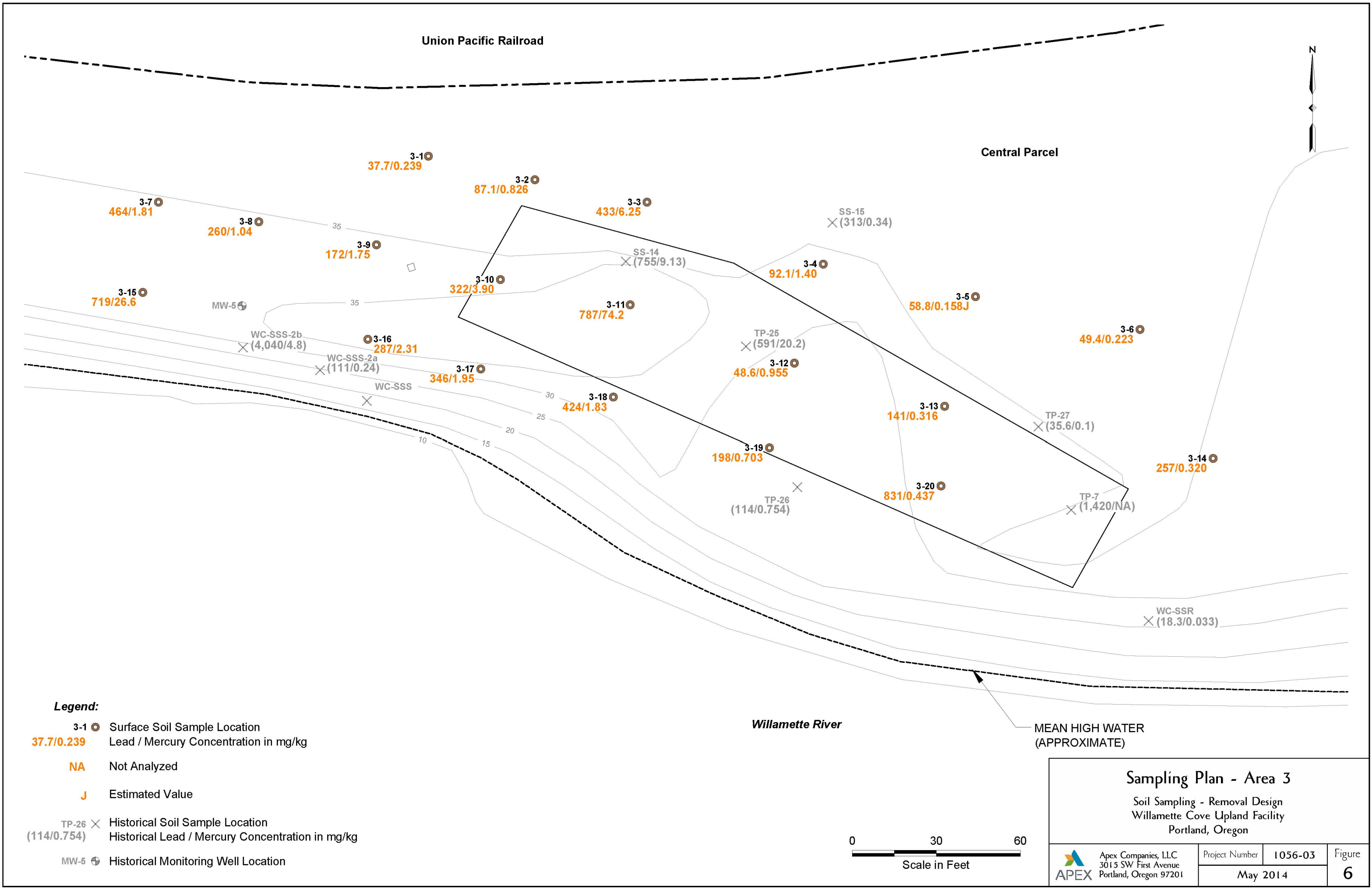
Soil Sampling - Removal Design
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Figure
5



Central Parcel



TP-29
X (230)

4-4
45.4

B-16
(35.2)

MW-6

4-1
46.7

4-2
40.9

4-3
44.8

4-5
40.5

4-6
34.5

4-7
50

SS-19
(744)

WC-SSQ
X (27.2)

MEAN HIGH WATER
(APPROXIMATE)

Willamette River


0 30 60
Scale in Feet

Legend:

- 4-1 Surface Soil Sample Location
46.7 Copper Concentration in mg/kg
- TP-29 X Historical Soil Sample Location
(230) Historical Copper Concentration in mg/kg
- MW-6 Historical Monitoring Well Location

Sampling Plan - Area 4

Soil Sampling - Removal Design
Willamette Cove Upland Facility
Portland, Oregon

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Figure
7

Union Pacific Railroad

Central Parcel

REMOVAL
EXCAVATION AREA

WCP-5
X (0.404)

5-5
3.39

5-4
0.709

WCP-6
(6.12)

WCP-9
(0.116)

WCP-1
(0.104)

5-1
3.16

5-2
1.92

5-3
4.54

5-6
2.50

5-7
2.22

5-8
1.84

5-9
0.418

SS-24
X (0.237)

0 30 60
Scale in Feet

Legend:

- 5-1 ● Surface Soil Sample Location
- 3.16 Mercury Concentration in mg/kg
- SS-24 X Historical Soil Sample Location
- (0.237) Historical Mercury Concentration in mg/kg

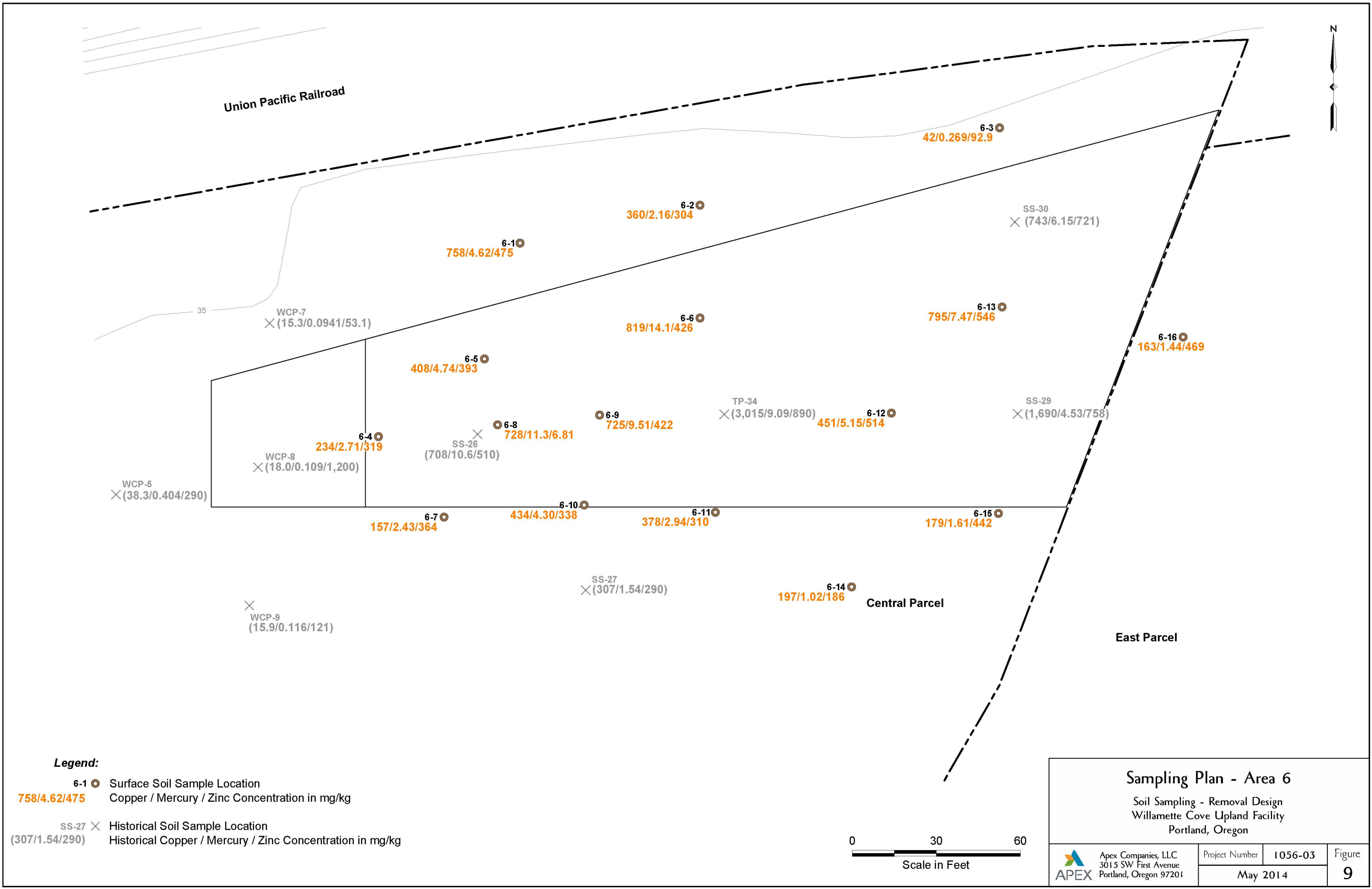
Sampling Plan - Area 5

Soil Sampling - Removal Design
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Figure
8



Legend:

- 6-1 ● Surface Soil Sample Location
758/4.62/475 Copper / Mercury / Zinc Concentration in mg/kg
- SS-27 X Historical Soil Sample Location
(307/1.54/290) Historical Copper / Mercury / Zinc Concentration in mg/kg



Sampling Plan - Area 6

Soil Sampling - Removal Design
Willamette Cove Upland Facility
Portland, Oregon



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